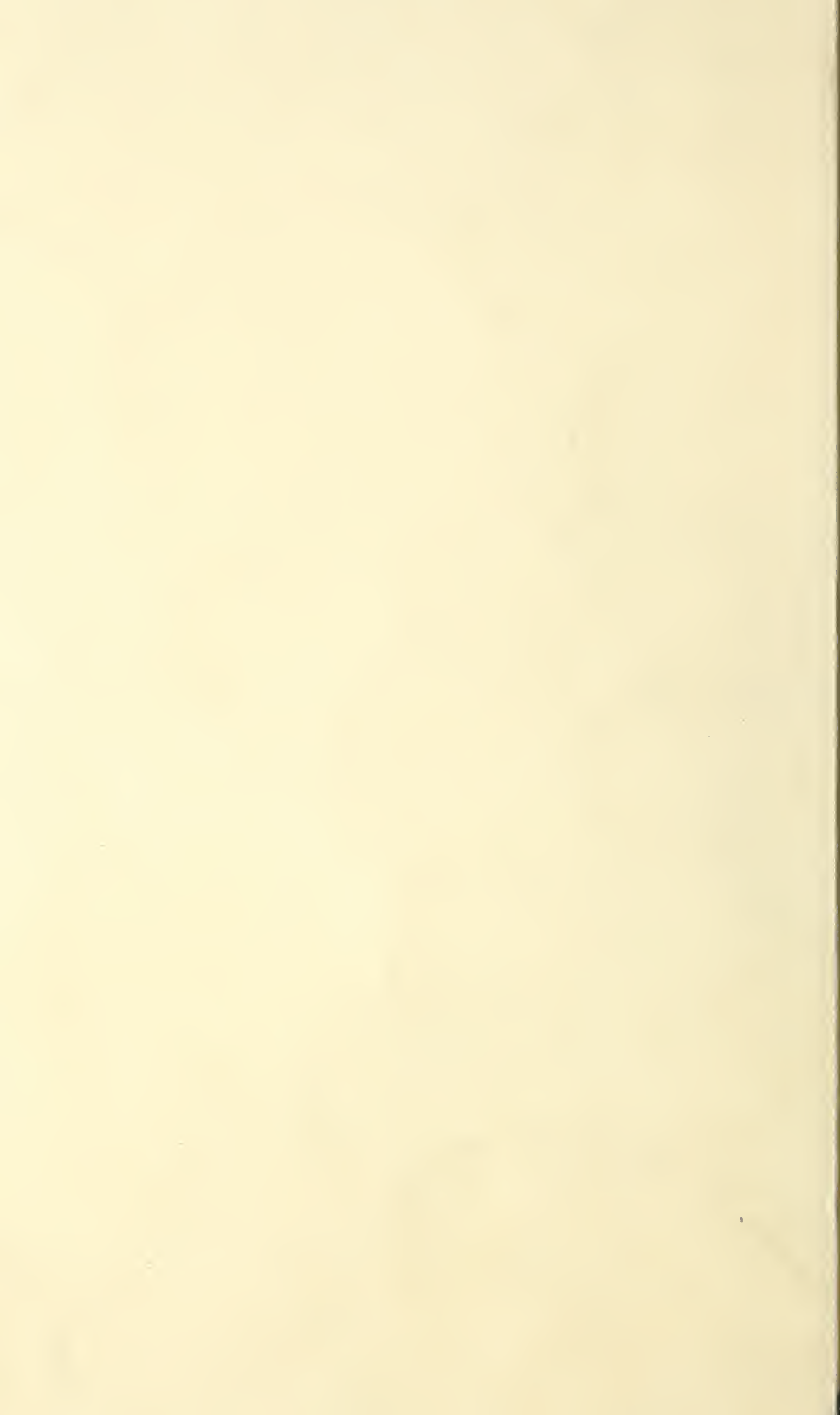


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# PULP-WOOD CROPS IN THE NORTHEAST



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# PULPWOOD CROPS IN THE NORTHEAST

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Spruce and fir, the pulpwoods of the Northeast, are increasingly in demand for paper making. Growing spruce and fir timber is a profitable business. But if the life of that business is to depend upon present stands of timber only, or upon what new growth may be produced by natural means alone, then pulpwood production in the Northeast is going to go into a decline and many thousands of acres of farm woodland and forest land will drop from high productivity to low productivity, if they do not indeed become valueless as revenue producers.

The significant fact in this situation is that conditions for the production of continuous forest or woodland "crops" are particularly favorable in the spruce and fir region of the Northeast. Under certain circumstances man need only cut the pulpwood clear and protect his land from fire to have a new crop of pulpwood take the place of the old within two generations or less. However, when circumstances are not the most favorable the landowner must take necessary steps to come to nature's aid, lest the next pulpwood crop be greatly delayed or depreciated.

The most important consideration, upon which the pulpwood producer must base whatever form of forest management he practices, is the presence or absence of sufficient young growth of spruce and fir in the stand before the mature wood crop is cut. It is from this advance growth that the new pulpwood crop must be matured. "Seeding in" after cutting seldom if ever produces satisfactory stands of pulpwoods, even were the delay in growth of no account. Consequently, the condition of advance reproduction in the stand determines very definitely how and when the stand should be cut, as well as the measures that the owner must thereafter employ to aid the next crop's development.

## General Conclusions Regarding Management of Pulpwood Stands

Management of pulpwood stands for continuous, profitable crops is based on certain broad conclusions arrived at as the result of intensive studies of a large number of stands, which will here be briefly applied to the various types of forest in the Northeast. These conclusions can be stated in general terms as follows:

(1) An area that lacks a due number or proportion of established seedlings of pulpwood species at the time of cutting will under natural conditions be deficient in these species in the mature stand.

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<sup>1</sup> Maintained at New Haven, Conn., in cooperation with Yale University.



(2) Advance pulpwood reproduction that has reached a height of 2 feet on the more favorable sites, or 4 or 5 feet otherwise, can normally be counted upon to compete with brush and hardwoods in the new stand. (Fig. 1.) Reproduction less than 2 feet high often fails completely. Owners must not clear-cut their stands, even under the most favorable conditions, until the spruce and fir reproduction is well established.



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FIGURE 1.—Well-developed reproduction such as this puts on rapid growth when released by cutting and is usually able to compete successfully with brush and young hardwoods, where smaller reproduction might fail

(3) Where reproduction is deficient or absent, the nature of the mature stand will determine what hope there may be of obtaining a satisfactory new crop of pulpwood by forest management.

(4) No reliance should be put in scattered seed trees. If reproduction is adequate, they are superfluous. If reproduction is scanty, they will add little to the density of what new growth might be on the ground and, because of the shallow-rooting habits of spruce and fir, there is every likelihood that they will be wind thrown. (Fig. 2.)

(5) Where advance growth of pulpwoods is in the minority, so that following cutting there will be a preponderance of hardwoods in the new stand, cultural measures such as weeding and girdling will be needed to free the young conifers and assure them their due place in the final stand.

How these conclusions may be applied to the various types of pulpwood stand is briefly indicated in the following paragraphs:

### Cuttings in Pure Softwood Stands

Pure softwood stands are those composed entirely or predominantly of softwood species (conifers). In pure softwood stands where a goodly supply of reproduction 2 or more feet high is already



FIGURE 2.—The windfall shown has taken place during the first year following a cutting that removed the mature spruce and hardwoods from this stand. Succeeding years will witness additional damage. Such stands, if they are not to be clear-cut, should be cut lightly enough to insure a minimum of windfall

present, clear-cutting of all the merchantable material is recommended. The removal of this merchantable stand admits the light and permits rapid development and growth of the reproduction already established.

Where adequate reproduction is lacking, a "shelter-wood" system of cutting should be practiced. By this system one-third to one-half of the stand may be removed in such a way as to open up the stand uniformly and permit the establishment of additional reproduction under the shelter of the remaining trees. Ten to fifteen years later, when under normal conditions sufficient reproduction will have come in, the remainder of the old stand—which generally will be found to have put on increased growth since the first cut—may be logged. Shelter-wood cuttings should not be too heavy, and should remove the timber in such a way that a fairly uniform stand



is left; otherwise wind throw may result, destroying merchantable timber as well as defeating the main purpose of the operation.

### Cuttings in Mixed Hardwoods and Softwood Stands

In mixed stands in which adequate reproduction of the pulpwood species is already established, the removal of all merchantable material, both hardwood and softwood, is recommended. This procedure generally leaves only a small number of the larger trees, whose shade thus has little adverse effect upon the reproduction. Brush species and hardwood seedlings will nevertheless furnish considerable competition, which varies with the character of the original stand. The competition will be more severe in those areas upon which sugar maple and beech predominated among the hardwoods



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FIGURE 3.—A cutting in the mixed spruce and hardwoods forest invaded by a dense growth of pin cherry and other worthless species. The spruce and fir seedlings are already hidden away in the cherry. If they were numerous, it would pay to release them by a cleaning that would remove the hardwood competition

than where yellow birch held that position. In stands in which yellow birch predominates, pulpwood reproduction should average at least 2 feet in height before cutting, but where maple and beech predominate, it is essential to wait until it has attained 5 feet.

Where adequate reproduction of the pulpwood species is not present in mixed hardwood and softwood stands, no method of cutting that is now practicable will, with any certainty, prevent an increased representation of hardwoods in the succeeding stand. (Fig. 3.) Stands in which sugar maple and beech are the predominant hardwoods are particularly liable to be unsatisfactorily stocked with spruce and fir reproduction. Clear-cutting, followed by planting and continued treatment for the reduction of hardwoods is probably the only way that this type of forest can be converted to a pulpwood stand. It appears to be more reasonable to handle such

stands with the primary purpose of improving and perpetuating both kinds of the young growth present than to attempt either a partial or total conversion to softwoods.

In dealing with mixed hardwood and softwood stands where no method of increasing the proportion of softwoods appears feasible at the present time, it is proper to consider that treatment for the betterment of the hardwoods as well as the softwoods may be justifiable, since it is quite possible that in the future profitable markets for hardwoods may be more common than now. To this end, and with no abnormal detriment to the softwoods, even-aged stands may be clear-cut; and all-aged stands may be cut by the selection system, which removes the older age classes and retains the younger for increased growth and quality.



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FIGURE 4.—Spruce and fir reproduction has grown rapidly since its release from suppression by a large yellow birch, of which the stump can be seen in foreground. Such release can be effected as well by girdling as by the actual removal of the hardwoods

In addition to these control measures that owners may exert in harvesting their crop, treatment may be applied after logging to reduce competition from the hardwoods and favor the softwood species.

### Girdling Unprofitable Hardwoods

A simple and relatively inexpensive means of releasing softwood reproduction from the oppressive shade of hardwoods that remain after cutting is to kill the hardwood trees by girdling. This practice, however, should generally be confined to old, unmerchantable trees, or to trees of poor form or quality. (Fig. 4.) When applied to younger, more thrifty hardwoods, girdling should be limited to those areas where the prospects for a profitable future market for hardwoods are definitely remote. To make the cost of girdling as



low as possible, only those hardwoods showing no signs of deterioration or those whose crowns are suppressing the reproduction should be girdled. Delaying the girdling operation until several years after cutting will allow this to be more readily determined than if the work is done at the time of or soon after cutting.

### Cleanings at Regular Intervals

Where cutting and girdling are followed by an invasion of sprout and seedling hardwoods, a cleaning (cutting or other destruction) of these encroaching hardwoods should be carried out. Five to eight years after cutting is the best time for the first cleaning to be made. At that time the hardwoods are still small and can easily be cut or broken over by hand. Eight to fifteen years after cutting the young hardwoods are still fairly easy to deal with in this manner, but the treatment is more expensive because of their increased size. Where softwoods grow more readily and competition from the hardwoods does not develop so quickly, no cleaning may be necessary until 8 to 15 years have elapsed. After 15 years, the undesirable



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FIGURE 5.—An old conifer slash pile, such as that shown in the foreground, kills advance reproduction and prevents the establishment of new seedlings, as is indicated by the vigor of the reproduction outside the influence of the pile. If such slash is burned a more complete stocking of the area will result

species may have formed a complete overstory to the desirable species, and cleaning is generally impracticable. Sometimes, however, the results to be gained by the removal or destruction of the undesirable overstory may justify the cost.

### Methods of Slash Disposal

The long period during which the débris or "slash" from the pulpwoods may constitute a menace to the young trees justifies the cost of certain slash-disposal measures. Heavy softwood slash, aside

from the fire hazard it represents, forms so dense a cover that it effectually smothers out the advance reproduction beneath it. Slash-disposal measures should aim to reduce the density of heavy slash to the point where it is no longer a deterrent to reproduction.

Since the quantity of softwood slash will vary with the proportion of spruce and fir in the stand, no uniform policy of slash disposal can be applied to all stands. In some instances, as for example in certain mixed spruce-hardwood types where conifers have a normally low representation, no slash-disposal measures will be necessary. In other mixed types having a higher representation of conifers, satisfactory density of slash can be obtained by scattering only, while in pure or nearly pure softwood stands burning, or a combination of burning and scattering, may be required to satisfactorily reduce density.

The practice of lopping the branches so that they will be close to the ground, without burning, has little to commend it in the Northeast, since it only slightly reduces the fire hazard, and where the slash is dense there is still danger that it will smother the seedlings. (Fig. 5.)

A scheme for disposal on areas with extremely dense slash such as may occur on spruce slopes, burning only the densest slash and that on the most hazardous areas, as along roads and railroads, is burned, should appeal to many private owners. Such a method, supplemented by fire lanes which break the slash areas into smaller units and by intensive patrol, should provide adequate protection for these cut-over lands.

Where slash must be burned there are several methods which may be followed. Piling of tops and branches, followed by burning at a safe time, is one effective method. Another method, that of throwing the slash on a burning pile as logging progresses, has many advantages when conditions are such that there is little danger of fires running and getting out of control.

